

## EXECUTIVE SUMMARY

The U.S. Department of Energy (DOE) proposes to raise the biosolids land application radionuclide loading limits from the current, self-imposed 4 mrem/yr lifetime loading to the Tennessee Department of Environment and Conservation (TDEC)-approved level of 10 mrem/yr. The planning level increase is necessary for industrial development within the Oak Ridge community. In addition, DOE proposes to allow the discharge of treated wastewaters from the West End Treatment Facility (WETF) to the Y-12 Plant and City of Oak Ridge sanitary sewer systems, resulting in an operational cost savings of approximately \$133,000 per year.

The Oak Ridge Reservation (ORR) Biosolids Land Application Program has been in operation since 1983, utilizing 6 application sites on a total of 133 ha (329 acres) and has been awarded a number of awards from regulators for excellence in biosolids management, most recently in 1999 by EPA Region IV, the program's permitting authority. WETF is a process wastewater treatment facility located at the Y-12 Plant that treats low levels of contaminated wastewater for discharge directly through a National Pollutant Discharge Elimination System (NPDES) permitted outfall to East Fork Poplar Creek (EFPC).

Residual Radioactivity (RESRAD) modeling was performed for the proposed 10 mrem/yr planning level increase. Risk factors were calculated for each nuclide. All nuclides were within the acceptable EPA and DOE risk of  $1 \times 10^{-4}$  for a resident living on the land application site, drinking the water, etc. These calculated risks represent a "worst-case" scenario because the existing land application sites are physically isolated and access to the public is restricted during biosolids land application operations.

To obtain a forecast of what the actual application soil radionuclide concentrations would be at the end of site life, a predictive model was prepared. The results demonstrated that 47.1% of the proposed 10 mrem/yr planning level would be achieved for the most heavily loaded site, the Rogers Site. This corresponds to an approximate 4.71 mrem/yr for the cumulative exposure received on-site by a resident. Human health risk assessments were also performed using actual radioactive loading levels and land application operational parameters to simulate what the true exposure scenarios to a worker or a transient would be. The risk factors ( $4 \times 10^{-7}$  for a worker and  $1 \times 10^{-7}$  for a transient) were well below the acceptability value of  $10^{-4}$  and the maximum calculated dose received would be 0.143 and 0.016 mrem/yr for a worker and transient, respectively, representing little to no measurable increases in dose or risk for the proposed planning level increase.

The addition of the WETF effluents into the sewer system also produces a negligible impact on both the risk and dose factors on the ORR land application sites and City of Oak Ridge NPDES discharge point. A total of 7.56 kg of uranium from WETF operations would be land applied on an annual basis on land application sites. This amount correlates to a 0.04 g/kg increase in the total uranium levels for the city biosolids and 0.002 mg/kg or 0.7 pCi/g increase in application site soils over the life of the most heavily loaded application site. Consequently, this increase in total uranium only represents 0.0014% of the proposed 10 mrem/yr planning level, which is negligible.

A human health risk assessment was also performed for the proposed WETF sanitary sewer discharge limits and was compared to actual discharge analytical data for the existing WETF NPDES Outfall. The assessment was extremely conservative assuming no removal of WETF contaminants at the city wastewater treatment plant and no dilution with EFPC. Even using this conservative scenario, the calculated risk ( $4.59 \times 10^{-9}$ ) of discharging treated WETF effluents to the sanitary sewer system was well below the acceptable risk value of  $10^{-4}$ .

Minimal impacts to biota, natural resources, and humans would be expected under the proposed action based on the evaluation of socioeconomic and environmental factors. Combined chemical and radiological impacts to human health would be minimal and within or below DOE and EPA target ranges, as previously discussed. Transportation risk would also be very low.

The no action alternative would impact the City of Oak Ridge's ability to sustain future industrial growth due to the lack of radionuclide capacity within the sewer system. This could force the city to alter and even discontinue existing government and commercial radionuclide discharges to the sanitary sewer system, limit industrial growth to remaining radionuclide capacity or leave the existing ORR land application sites altogether in favor of free distribution of the biosolids material to the public. This could directly impact the city's acceptance of the ORNL biosolids and could result in the management of sanitary ORNL biosolids as low level radioactive waste because of the lack of other viable sanitary waste options for the material. This change would result in an operational cost increase of \$67,000 per year for DOE Oak Ridge Operations. Future commercial and DOE sanitary wastewater projects could also be affected by the city's limited radionuclide capacity; however, direct socioeconomic impacts are impossible to forecast. The projected cost savings of \$133,000 per year for WETF operations would also not be realized.